

Description of 12005

Rock 12005 is a medium-grained, olivine basalt possessing exceptionally high Mg content. Large pyroxene oikocrysts enclose an early crystallizing assemblage of rounded and embayed olivine (fig. 23). Patches of glomerophyric olivine are present in some areas. This Apollo 12 rock has been studied (Dungan and Brown 1977); its composition is given in table IV.

Olivine - In this rock, a duality of olivine textures may be noted. Large olivine grains (up to 5 mm) are rounded and embayed and contain relict inclusions; they also have relict skeletal shapes. Smaller, euhedral olivines are poikilitically enclosed within plagioclase or pyroxene oikocrysts. The larger olivines are more magnesian than are the euhedral grains in the plagioclase.

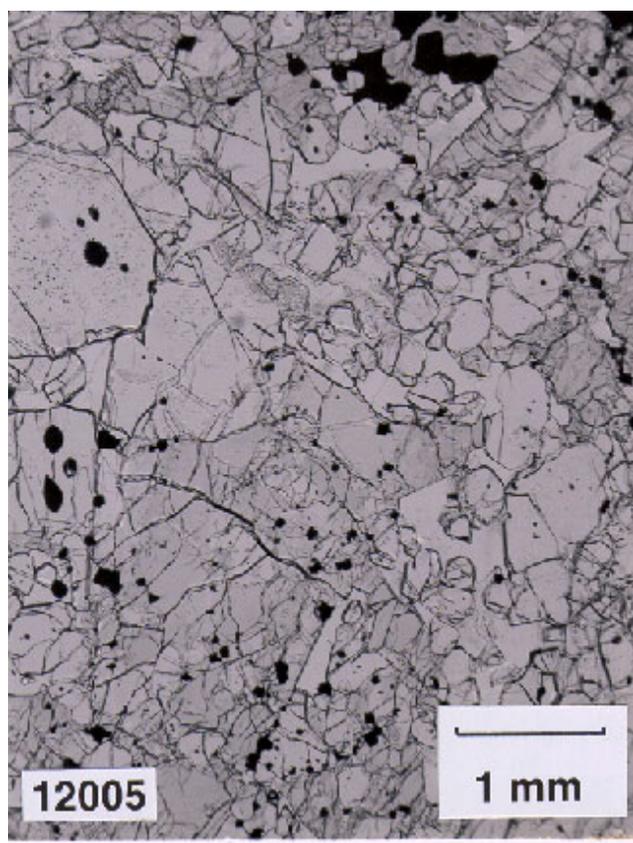


Figure 23 - Texture of mare basalt 12005. Speckled olivine phenocrysts containing inclusions of chromite and melt are surrounded by pyroxene. Large oikocrysts of plagioclase enclose equant olivine crystals.

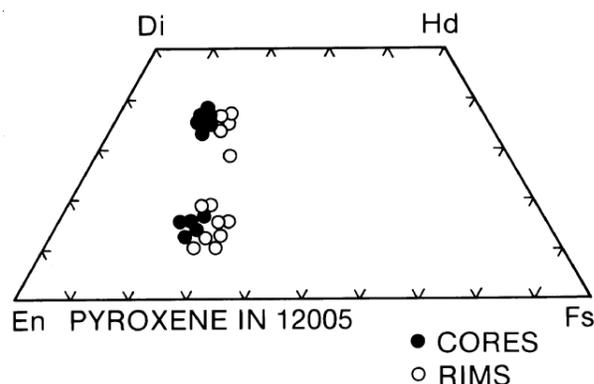


Figure 24 - Pyroxene quadrilateral for 12005. Note apparent separation of high-Ca and low-Ca pyroxene. The lack of Fe enrichment in pyroxenes indicates that this sample cooled slowly.

Pyroxene - The majority of large pyroxene grains in sample 12005 are composed of augite cores rimmed with low-Ca pyroxene. However, several of the largest include augite plus low-Ca pyroxene grains intergrowths in their cores. Additionally, some partially resorbed olivine grains are partly mantled by low-Ca pyroxene. The relatively complete separation of augite and low-Ca pyroxene on the pyroxene quadrilateral (fig. 24) was not observed in other lunar basalts.

Plagioclase - Large oikocrysts of plagioclase enclose equant olivine grains. Plagioclase grains are intergrown with pyroxene oikocrysts at their margins. Plagioclase is unzoned An_{93-86} except where it is alkali-rich at the very edge adjacent to rare segregations of K-feldspar and phosphate.

Opaques - Euhedral chromite-ulvöspinel grains and associated metallic Fe occur as inclusions in the olivine. Individual chromites are not zoned to ulvöspinel but range in composition throughout the relative crystallization sequence. Intergranular ilmenites poikilitically enclose olivine and pyroxene. Subsolvus exsolution in ilmenite and ulvöspinel are widespread in sample 12005 (fig. 25).

Mesostasis - In this basalt, the less than 0.5 percent mesostasis is often located in embayments within

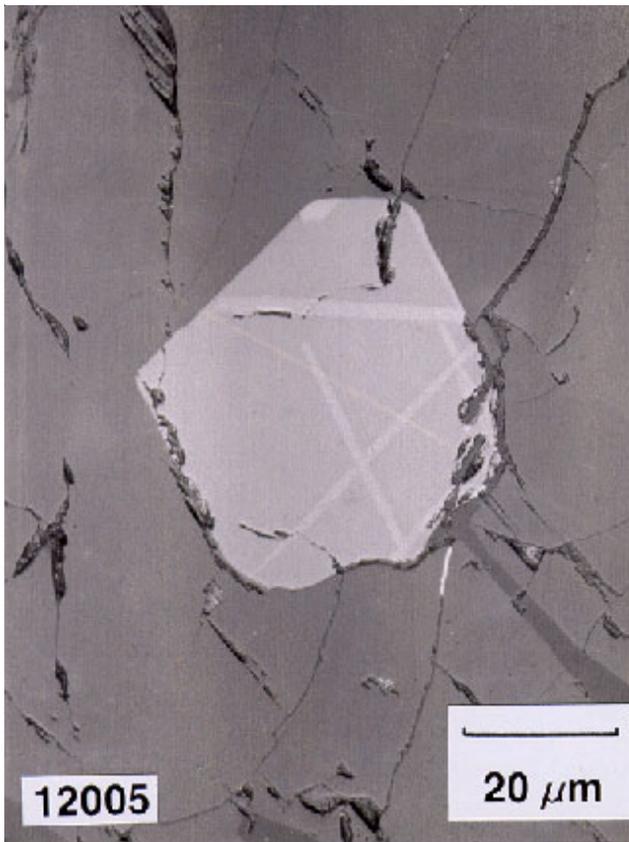


Figure 25 - Euhedral ulvöspinel with an exsolution of ilmenite in 12005. This is a reflected light photo.

poikilitic ilmenite. Where it occurs, mesostasis includes minute troilite, K-feldspar, bytownite, and whitlockite.

Petrogenesis - This rock probably represents a slowly cooled, olivine cumulate from a lake of basaltic lava on the lunar surface! The wide separation of pyroxene composition indicates an approach to an equilibrium solvus.